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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/897,904	07/05/2001	Tatsuo Fukui	109686	1427
25944	7590	04/27/2004	EXAMINER	
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			STOCK JR, GORDON J	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 04/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/897,904

Applicant(s)

FUKUI, TATSUO

Examiner

Gordon J Stock

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. **Claims 3-8** are objected to for the following: for **claim 3** "the line and space mark pattern" of line 19 lacks antecedent basis; for **claim 4** "the axis" of line 6 lacks antecedent basis; for **claim 5** "the line and space mark pattern" of line 21 lacks antecedent basis; for **claim 6** "the axis" of line 6 lacks antecedent basis; for **claim 7** line 6 cites "the focus characteristic curve of a value Q;" whereas, the disclosure cites a focus characteristic of value Q and a focus characteristic curve, QZ; for **claim 8**, "the axis" of line 20 lacks antecedent basis. Corrections are required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 3-7 and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Sugaya et al. (5,754,299)**.

As for **claims 3-7 and 9**, Sugaya teaches in an inspection apparatus for alignment: an irradiation optical system; an image forming optical system; an imaging device for capturing the image; an image processing device for measuring positional deviation; an image field position adjustment mechanism; wherein said image field position adjustment mechanism comprises a field stop provided on said irradiation optical system, a field stop position adjustment mechanism

Art Unit: 2877

for adjusting a position of said field stop, in a plane perpendicular to the optical axis, and an imaging device position adjustment mechanism for adjusting a position of said imaging device, said field stop and an imaging surface of said imaging device are disposed in optically conjugate positions, and said imaging device position adjustment mechanism adjusts the position of said imaging device in accordance with the field stop positional adjustment effected by said field stop position adjustment mechanism (col. 6, lines 50-67; col. 7, lines 1-20; Fig. 19; cols. 24-25; col. 26, lines 1-10); wherein said image field position is so adjusted that at least one set of areas which are symmetric with respect to the center of the image field is selected (col. 32, lines 1-25). As for marks, Sugaya discloses street and line marks for a wafer mark (Fig. 20); and discloses that the embodiment may be used for overlay using a main scale and vernier (col. 26, lines 65-67; col. 27, lines 1-10). Therefore, it would be obvious to one skilled in the art at the time the invention that a first mark and second mark comprising a street and line pattern were used for overlay measurements, for the system utilizes a mark comprising a first mark, main scale, and a second mark, a vernier.

In addition, Sugaya discloses adjusting field position on the basis of an asymmetric focus characteristic of the pattern image; wherein said image field position is so adjusted that the focus characteristic on a signal intensity difference at a stepped portion on both sides is used (Figs. 3-6; Figs. 8-12; Figs. 14-17; col. 4, lines 35-60; col. 5, lines 1-30; col. 13; lines 35-67; col. 14, lines 1-45; col. 15, lines 15-67; col. 17, lines 40-67). As for claim 7, see figure 8 and col. 17, lines 1-30). The asymmetry index utilizes voltage rather than intensity, but it is well known that voltage is proportional to intensity. Therefore, it would be obvious to one skilled in the art at the time the invention was made that the asymmetry index was the focus characteristic value for voltage

is proportional to intensity of signal. As for **claim 9**, refer to **claim 7** above and for adjustment steps 1-3 refer to broadly cols. 18-19 and specifically, col. 19, lines 25-40; col. 23, lines 10-40.

In addition, as for the adjustment of the image field position and field stop on the basis of the asymmetric focus characteristic, see Figs. 21-23 in relation to Figs. 9-11 whereas, the adjustments are made in view of the asymmetry index to correct symmetric and asymmetric aberrations (col. 26, lines 52-67; col. 27, lines 1-67; col. 28, lines 1-60).

As for making the focus characteristic symmetric to an axis that passes through the center of the visual field, see Fig. 9. Figure 9, L5, is the ideal value for the asymmetry index curve, a straight line symmetric with the z axis. Figure 11 is a normal system's asymmetry index curve. Therefore, it would be obvious to adjust the system in order to remove aberrations in order for the system to have an asymmetry index symmetric to the z axis as in Figure 9. Also Figures 9-11 have the asymmetry index having at least one value of zero.

4. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Sugaya et al. (5,754,299)** in view of **Konno et al. (6,081,385)**.

As for **claim 8**, Sugaya discloses the following in an inspection apparatus for alignment: an irradiation optical system; an image forming optical system; an imaging device for capturing the image; an image processing device for measuring positional deviation; an image field position adjustment mechanism; wherein said image field position adjustment mechanism comprises a field stop provided on said irradiation optical system, a field stop position adjustment mechanism for adjusting a position of said field stop, in a plane perpendicular to the optical axis, and an imaging device position adjustment mechanism for adjusting a position of said imaging device, said field stop and an imaging surface of said imaging device are disposed

Art Unit: 2877

in optically conjugate positions, and said imaging device position adjustment mechanism adjusts the position of said imaging device in accordance with the field stop positional adjustment effected by said field stop position adjustment mechanism (col. 6, lines 50-67; col. 7, lines 1-20; Fig. 19; cols. 24-25; col. 26; lines 1-10); wherein said image field position is so adjusted that at least one set of areas which are symmetric with respect to the center of the image field is selected (col. 32, lines 1-25). As for marks, Sugaya discloses street and line marks for a wafer mark (Fig. 20); and discloses that the embodiment may be used for overlay using a main scale and vernier (col. 26, lines 65-67; col. 27, lines 1-10). Therefore, it would be obvious to one skilled in the art at the time the invention that a first mark and second mark comprising a street and line pattern were used for overlay measurements, for the system utilizes a mark comprising a first mark, main scale, and a second mark, a vernier.

In addition, Figures 7 and 8 suggest that the whole line and space pattern may be the selected area, and the Sa of Figure 7 suggests that a single line and space area may be used. In addition, as for the adjustment of the image field position and field stop on the basis of the asymmetric focus characteristic, see Figs. 21-23 in relation to Figs. 9-11 whereas, the adjustments are made in view of the asymmetry index to correct symmetric and asymmetric aberrations (col. 26, lines 52-67; col. 27, lines 1-67; col. 28, lines 1-60).

As for making the focus characteristic symmetric to an axis that passes through the center of the visual field, see Fig. 9. Figure 9, L5, is the ideal value for the asymmetry index curve, a straight line symmetric with the z axis. Figure 11 is a normal system's asymmetry index curve. Therefore, it would be obvious to adjust the system in order to remove aberrations in order for

the system to have an asymmetry index symmetric to the z axis as in Figure 9. Also Figures 9-11 have the asymmetry index having at least one value of zero.

As for the rotational asymmetric aberration being symmetric in relation to an axis, Sugaya mentions that coma may be an asymmetric aberration (col. 6, lines 1-2). Ideally, one would want the asymmetry index curve comprising aberrations both asymmetric and symmetric be symmetric in regards to the z-axis (Figure 9). He is silent concerning a rotational aberration. However, Konno in an optical system design teaches that a rotational asymmetric aberration may comprise coma (col. 6, lines 18-19). Therefore, it would be obvious to one skilled in the art that the system adjusted for rotational asymmetric aberration for the system adjusts for coma.

Response to Arguments

5. Applicant's arguments with respect to claim 8 have been considered but are moot in view of the new ground(s) of rejection. As for the remarks of March 3, 2004 in regards to the Takahiko reference (JP 08-115874) and in light of the amendment of the claims Takahiko no longer reads on the newly amended claims. Therefore, the rejection under 35 U.S.C. 102(b) with Takahiko have been withdrawn. In regards to the 35 U.S.C. 112 second and first paragraph rejections, Examiner agrees with arguments and in light of the amendment of the claims. Thereby, the Examiner withdraws the 112 second and first paragraph rejections. Remarks to claims 3 and 5 are not found persuasive for the claims cite "the line and space mark pattern" which does not exclude a whole line and space mark pattern. In addition, Figures 7 and 8 of Sugaya (5,754,299) suggests that a single line and space are used because the Sa of Figure 7 is used.

As for the allowable subject matter previously cited (as in claim 4 of action dated December 5, 2003; claims 6-7 of advisory action of March 19, 2004), Examiner apologizes for the inconvenience but upon further consideration of the Sugaya reference (specifically, Figs. 9-11 and Figures 21-23 and the symmetry of the asymmetry index curve in relation to the z axis), a rejection to the claims has been made.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and

2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

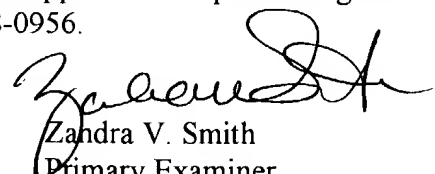
Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (703) 872-9306

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431. The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

gs

April 14, 2004


Zandra V. Smith
Primary Examiner
Art Unit 2877